

Amendment/Reply

Applicant: Michael R. Krause et al.

Serial No.: 09/578,155

Filed: May 23, 2000

Docket No.: 10991833-1

Title: RELIABLE DATAGRAM

REMARKS

This Amendment/Reply accompanies the Request for Continued Examination (RCE) 37 CFR 1.114 and is in reply to the Final Office Action mailed March 30, 2006 and the telephonic Examiner Interview on May 30, 2006. Claims 1-45 were rejected. With this Response, claims 1, 18, and 26 have been amended. Claims 1-45 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1-45 under 35 U.S.C. § 103(a) as being unpatentable over the Wilson et al. U.S. Patent No. 6,738,821 and further in view of W.A Shay, Understanding Data Communications and Networks, at page 260-281 (PWS Publishing Co., 1995) ("the Shay reference").

Amended Independent claims 1 and 18 include source SDR resources, at a source device, multiplexing units of work produced by at least one source application instance (AI) and destination SDR resources, at a destination device, demultiplexing the serial unit of work stream into units of work provided to at least one destination AI. Independent claim 26 includes multiplexing units of work produced by at least one source AI at the source device and demultiplexing the serial unit of work stream into units of work provided to at least one destination AI at the destination device. As recited in independent claims 1, 18, and 26, these limitations are also not taught or suggested by the Wilson et al. patent.

In addition, amended independent claims 1, 18, and 26 all include limitations related to implementing a reliable datagram service between the source device and the destination device which permits one AI to one AI, one AI to many AIs, and many AIs to one AI reliable communication. The Wilson et al. patent does not teach or suggest implementing a reliable datagram service between a source device and a destination device which permits one AI to one AI, one AI to many AIs, and many AIs to one AI reliable communication.

The multiplexing units of work produced by at least one application instant at the source device and demultiplexing the serial unit of stream into units of work provided to at least one destination AI at the destination device as recited in amended independent claims 1, 18, and 26 and the reliable datagram service according to the present invention permits one

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AI to one AI, one AI to many AIs, or many AIs to one AI reliable communication. The multiplexing permits multiple AIs to be coupled to the source SDR resources and the demultiplexing permits multiple destination AIs to be coupled to the destination SDR resources in a reliable datagram service between the source device and the destination device.

Embodiments of SDRs employed to implement a reliable datagram service employing the limitations of amended independent claims 1, 18, and 26 can re-use the same destination SDR resource set per multiple destination AIs. Thus, a reliable datagram service as implemented according to amended independent claims 1, 18, and 26 can reduce the number of SDR resource sets to create and manage which accordingly reduces AI implementation cost and design complexity. Therefore, the reliable datagram service implemented according to amended independent claims 1, 18, and 26 provides for highly scalable data processing systems. This is in contrast to a conventional reliable connection service, such as illustrated in Figure 1 and described in the Background of the present specification at page 1, line 22 through page 2, line 9. Such a reliable connection service provides reliable communication between AIs, but at the cost of scalability of the data processing system. In reliable connection services, communication at any one time is restricted to one-to-one AI relationships via corresponding non-sharable resource connections.

The reliable datagram service implemented according to amended independent claims 1, 18, and 26 is also contrasted to the conventional unreliable datagram service illustrated in Figure 2 and described in the Background of the present specification at page 2, lines 10-26. Such, unreliable datagram services provide for highly scalable data processing systems, but at the cost of reliability. In an unreliable datagram service, the AI relationships can be one-to-one, one-to-many, or many-to-one, but communication between AIs is not reliable. In particular, traditional unreliable datagrams do not provide guaranteed order of units of work transmitted between AIs. Moreover, the combination of the Wilson et al. patent and the Shay reference does not teach or suggest a reliable datagram service as defined by amended independent claims 1, 18, and 26 which provides guaranteed order of units of work transmitted between AIs.

The Wilson et al. patent teaches a simple transport protocol (STP) for a storage encapsulation protocol (SEP). The Wilson et al. patent specifically states at column 17, lines 45-49 that "STP provides datagram and data stream services for SEP. Datagram service is

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limited to applying the appropriate header and sending pre-formatted data on the Ethernet. It does not packetize data or provide any guarantee of packet delivery.”

The Wilson et al. patent actually teaches away from having the STP provide a reliable datagram service, because as described in the Wilson et al. patent, the STP provides a low overhead, local area network (LAN) oriented transport to efficiently move blocks of data to and from target devices. As stated at column 18, beginning at line 48, the STP “finds most benefit in local area networks in which high bandwidth storage transfers are required.” For the storage environment, one embodiment of the Wilson et al. patent utilizes the SCSI protocol. The parallel SCSI message system is very powerful, but very inefficient when used on a serial interconnect. Thus, the STP described in the Wilson et al. patent specifically limits its datagram service to applying appropriate header and sending pre-formatted data on the Ethernet and does not packetize data or provide any guarantee of packet delivery with the STP datagram service.

Moreover, amended independent claims 1, and 18 include limitations related to the source SDR resources including at least one queue configured to hold transmitted but not acknowledged units of work and not yet transmitted units of work. In addition, independent claim 26 includes limitations related to holding, at the source device, not yet transmitted units of work, and holding, at the source device, transmitted but not acknowledged units of work. As admitted by the Examiner, these limitations of amended independent claims 1, 18, and 26 are not disclosed in the Wilson et al. patent.

The Examiner relies on the Shay reference teaching of a well-known sliding window protocol, and the Wilson et al. patent specifically disclosing a sliding window at column 18, lines 17-18. First, the Wilson et al. patent at column 18, lines 17-23 does not teach a sliding window protocol such as disclosed in the Shay reference, but rather teaches a windowing technique where a Window value will be added to an acknowledgement field (Acknowledge) value to indicate the largest sequence number that the receiver can fit into its buffer space. Thus, the window value is for the receiver not the sender and the windowing technique disclosed in the Wilson et al. patent assures that the transmitter will not send a packet with a sequence number higher than the Acknowledge plus Window value. Thus, the windowing technique disclosed in the Wilson et al. patent specifically limits the size of packet which can be handled by the receiver to the Acknowledge plus Window value.

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As to the Shay reference, the Shay reference teaches a sliding window protocol where the window slides down as frames are acknowledged and new ones are sent, all frames before the window must have been acknowledged, frames in a given window can be outstanding, and no frames beyond the window may be sent until the window slides down. Nevertheless, the protocol described in the Shay reference assumes a conventional full-duplex mode of communication between a first station A and a second station B, and thus, defines a reliable connection mechanism between station A and station B similar to a reliable connection service described in the Background of the present specification and illustrated in Figure 1 of the present specification, rather than a reliable datagram service as implemented according to amended independent claims 1, 18, and 26.

In view of the above, amended independent claims 1, 18, and 26 are not taught or suggested by the combination of the Wilson et al. patent and the Shay reference.

Dependent claims 2-17 are allowable as depending from allowable base claim 1 and are allowable on further independent grounds in view of the novel and non-obvious features and combinations set forth therein. Dependent claims 19-25 are allowable as depending from allowable base claim 18 and are allowable on further independent grounds in view of the novel and non-obvious features and combinations set forth therein. Dependent claims 27-45 are allowable as depending from allowable base claim 26 and are allowable on further independent grounds in view of the novel and non-obvious features and combinations set forth therein.

Therefore, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 103 rejections to claims 1-45, and request allowance of these claims.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-45 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-45 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

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The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment/Reply should be directed to either Patrick G. Billig at Telephone No. 612-573-2003, Facsimile No. 612-573-2005 or Kevin Hart at Telephone No. (970)-898-7057, Facsimile No. (970) 898-7247. In addition, all correspondence should continue to be directed to the following address:

IP Administration
Legal Department, M/S 35
HEWLETT-PACKARD COMPANY
P.O. Box 272400
Fort Collins, Colorado 80527-2400

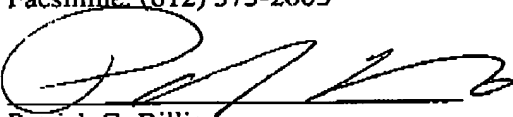
Respectfully submitted,

Michael R. Krause et al.,

By their attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-2003
Facsimile: (612) 573-2005

Date: 6-30-06
PGB:cmj:dmw


Patrick G. Billig
Reg. No. 38,080

CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being transmitted via facsimile to Facsimile No. (571) 273-8300 on this 30 day of June, 2006.

By: 

Name: Patrick G. Billig